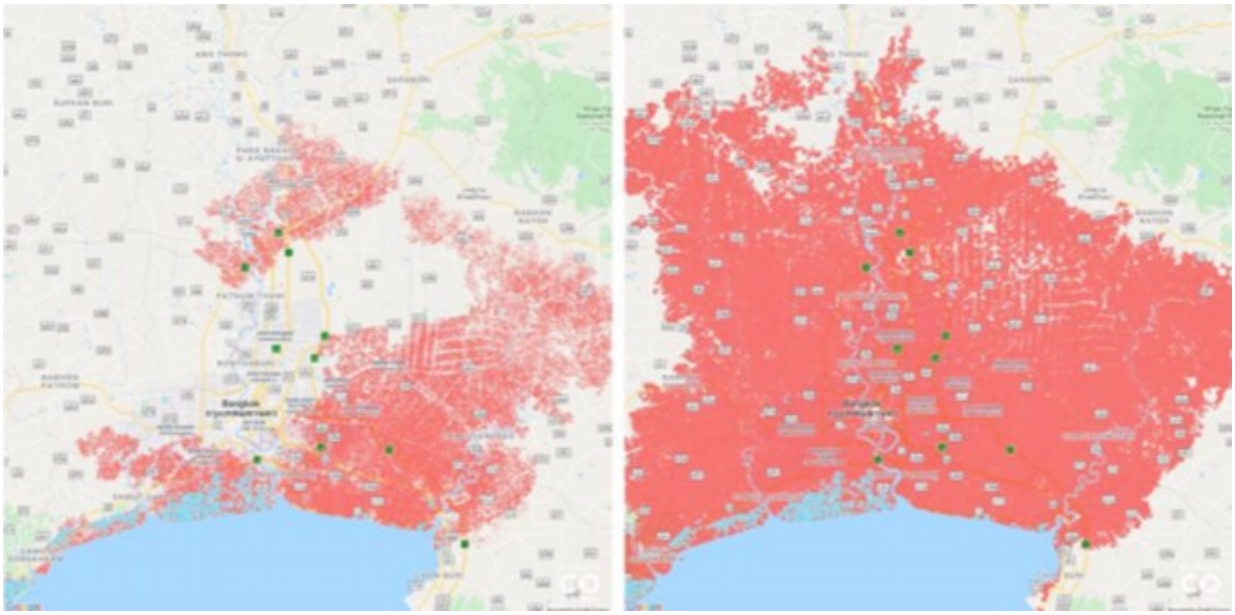
Three times more people at risk from yearly coastal flooding than previously thought

October 30 2019, by Komali Kantamaneni



The new model significantly expands the area around Bangkok, Thailand, that's expected to experience once-a-year coastal flooding by 2050. Credit: Climate Central

Before today, sea level rise and flooding were already forecast to wreak havoc for millions now and in the coming decades. Now, the story looks much worse—three times worse, to be precise. According to new research, hundreds of millions more people are already at risk from climate breakdown-caused coastal flooding and sea level rise than

previously thought. And by the end of the century, large swathes of the coastal land we live on today could be unihabitable—even with immediate and deep emissions cuts.

Existing estimates of risk from sea-level rise—taken from NASA's Shuttle Radar Topography Mission—didn't exactly paint a rosy picture for coastal communities. But in using space-based satellite imagery to measures the elevations of surfaces closest to the sky, much of the data actually reported the elevation of treetops and rooftops, rather than the ground itself. As a result, it overestimates coastal elevations by more than two metres on average, and more than four metres in urban areas.

This may not sound like much, but for millions of people two or three metres is the difference between safety or loss of livelihood and forced relocation. Thankfully, a handful of nations have now scanned coastal elevation using airborne laser-based radar equipment, and the new research, published in *Nature Communications*, uses the difference between these much more precise data and previously existing figures to recalibrate global estimates for land at risk of sea-level rise and flooding.

Based on the new model, the authors estimate not 28m but 110m people are already living below the current high tide line. And instead of 68m people living below annual flood levels, the figure is now 250m—the same number that live less than one metre above sea level. That's the equivalent of the UK, Russia, and Spain combined.

This increase in vulnerability to sea-level rise and flooding is not evenly distributed. More than 70% of those living on at-risk land are in eight Asian countries: China, Bangladesh, India, Vietnam, Indonesia, Thailand, the Philippines, and Japan. And for many of these countries, the increase in risk that the new model predicts for the coming decades is much higher than three-fold.

Of course, it's not just Asia that's vulnerable—20 other countries outside of the continent are expected to see land that is currently home to 10% of their total populations fall below end-of-century high tide lines, even if emissions peak by 2020 and are then cut deeply. This count is up from two using NASA's data. All but three are island nations, and 13 of the 20 are small developing island states.

We decide our fate

For these countries in particular, how we react to the climate crisis is hugely important. If emissions peak by 2020, land now home to roughly a fifth of the populations of Bangladesh and Vietnam may be lower than high tide lines in 2100. But if emissions continue unchecked, this proportion rises to a third.

What's clear though is that even in best case scenarios, levees, seawalls and other defences are going to be vital in protecting hundreds of millions of coastal residents. Countries are yet to agree on who will pay for new defences against sea-level rise and flooding, and the costs of losses and damages. In light of the sharp rise in the forecast vulnerability of nations that have contributed the least to global emissions, I sincerely hope that long industrialised powers accept their historical responsibility for emissions and protect those they have placed under threat.

Areas with existing defences aren't safe either. Eight of the ten largest cities in the world are situated on the coast, and many of them have relied on existing flood defences to allow so many millions of people to flourish on or below the high tide line.

These are by no means guaranteed to protect against future sea levels and storms – superstorms already breach flood defences in the most developed cities in the world. Many defences will need enhancing if they are to prevent large areas of the most populous cities from being

regularly submerged underwater.

Away from urban areas, the astronomical costs of protecting large areas from sea-level rise and flooding means that millions will need to be resettled in the coming decades—or else forcefully displaced by the rising seas we're causing. Even in countries such as the US and the UK, sea-level rise this century may require large-scale migration away from unprotected coastlines. In countries less able to cope, loss of lives and livelihoods, political chaos, and conflict are highly likely without support.

The sad reality is that coastal communities worldwide look to be set for much more difficult futures than currently anticipated. As a global community, governments must work together to do all they can to help.

Provided by The Conversation